PATENT
Attorney Docket No. 99154X204201
Client Refence No. 99154

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Stephen Marcus
Special Program Examiner
Group 3700

In re Application of:

Fang et al.

Application No. 09/595,227

Filed: June 16, 2000

For: METHOD FOR POLISHING A MEMORY OR RIGID DISK WITH A PHOSPHATE ION-CONTAINING POLISHING SYSTEM

Art Unit: 2766

Examiner: Hadi Shakeri

APPELLANTS' APPEAL BRIEF

Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

The following comprises Appellants' Brief on Appeal in support of the appeal of the decision of the Examiner of Group Art Unit 3723 per the final Office Action dated June 13, 2002. A Notice of Appeal was filed on October 18, 2002, and received by the United States Patent and Trademark Office on October 23, 2002, thereby making the appeal brief due on December 23, 2002. This Brief is transmitted in triplicate (37 C.F.R. 1.192(a)).

Real Party In Interest

The patent application that is the subject of this appeal is assigned to Cabot Microelectronics Corporation.

Related Appeals and Interferences

There are no appeals or interferences that are related to this appeal.

Status of Claims

Claims 1-23 are currently pending, are the subject of this appeal, and are set forth in the Appendix attached hereto.

Status of Amendments

The amendments filed subsequent to the final rejection have been entered.

In re Appln. of Fang et al.
Application No 09/595,227

Summary of Invention

The invention relates to a method of planarizing or polishing a memory disk by abrading at least a portion of the surface of the memory disk with a polishing system comprising (i) a polishing composition comprising water, an oxidizing agent, and about 0.04 M or higher phosphate ion or phosphonate ion, and (ii) abrasive material.

Issues

The issues on appeal are as follows:

(i) whether the subject matter of claims 1-14 and 17-23 is obvious under 35 U.S.C. § 103(a) over U.S. Patent 6,190,237 (Huynh et al.) in view of U.S. Patent 6,069,080 (James et al.) and

(ii) whether the subject matter of claims 15 and 16 is obvious under 35 U.S.C. § 103(a) over U.S. Patent 6,190,237 (Huynh et al.) in view of U.S. Patent 6,069,080 (James et al.) and further in view of U.S. Patent 6,152,976 (Ishitobi et al.).

Grouping of Claims

The appealed claims do not stand and fall together. For the reasons discussed below, and as confirmed by the Examiner's separate rejection of the claims, claims 1-14 and 17-23 should be considered separately from claims 15 and 16 for purposes of this appeal.

Argument

A. Rejection of Claims 1-14, and 17-23 Under Section 103(a)

The final Office Action alleges that the subject matter of claims 1-14 and 17-23 is obvious under Section 103(a) in view of the combined disclosures of Huynh et al. and James et al. In particular, the Office Action relies on Huynh et al. for its disclosure of a chemical-mechanical polishing (CMP) system comprising water, an oxidizing agent, about 0.04 M or higher phosphate ion or phosphonate ion, and abrasive material, but recognizes that Huynh et al. does not disclose the use of the CMP system in a method of planarizing a memory disk, as recited in the appealed claims. The Office Action relies on James et al. for its recitation of a CMP system for use in planarizing substrates including memory disks and semiconductor devices, but recognizes that James et al. does not disclose a CMP system comprising about 0.04 M or higher phosphate ion or phosphonate ion. However, the Office Action alleges that it would have been obvious to combine the disclosures of these references in such a way as to arrive at the present invention.

Received from < > at 7/23/03 12:47:25 PM [Eastern Daylight Time]

In re Appln. of Fang et al.
Application No 09/595,227

As is well-settled, in order to establish a prima facie case of obviousness, three basic criteria must be met: (a) there must be some suggestion or motivation to modify the reference or to combine reference teachings, (b) there must be a reasonable expectation of success, and (c) the prior art references must teach or suggest all the claim limitations. See e.g., M.P.E.P. § 2143.

(a) There Is No Suggestion Or Motivation To Combine The Cited References

The Section 103(a) rejection is improper because there is no suggestion or motivation to combine the references in such a way as to arrive at the claimed subject matter. In order to set forth a *prima facie* case of obviousness based on a combination of references under Section 103(a), the Office Action must identify a "clear and particular" teaching, suggestion, or motivation to combine the references. *In re Demiczak*, 175 F.3d 994, 999 (Fed. Cir. 1999), *abrogated on other grounds* by *In re Gartside*, 203 F.3d 1305, 1316, 53 U.S.P.Q. 2d 1769, 1769-1770 (Fed. Cir. 2000); *In re Rouffet*, 149 F.3d 1350, 1357 (Fed. Cir. 1998); *Uniroyal, Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 1051 (Fed. Cir. 1988). As the Federal Circuit has stated, "combining prior art references without evidence of such a suggestion, teaching or motivation simply takes the inventor's disclosure as a blueprint for piecing together the prior art to defeat patentability – the essence of hindsight." *In re Demiczak*, 175 F.2d at 999.

In support of the Section 103(a) rejection, the final Office Action alleges that it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to apply the CMP system of Huynh et al. to the polishing of a memory disk, "since it is known in the art to use a CMP system for manufacturing of both semiconductor devices and memory disk" (Office Action, p. 2, citing James et al. at col. 1, lines 34-37). The Office Action implies that the disclosure of James et al. teaches that any polishing system that is shown to be useful for polishing semiconductor devices is also useful for polishing memory disks, and vice versa. However, such an interpretation of James et al. is erroneous. The polishing system disclosed by James et al. comprises (1) a fixed abrasive polishing pad and (2) a polishing fluid. James et al. does not disclose any required components for the polishing fluid and only suggests that the polishing fluid is "preferably water based," "may comprise polishing particles," and "preferably comprises a pH modifier." While it is true that James et al. suggests that the polishing system comprising the fixed abrasive pad and the undefined polishing fluid can be used in the manufacture of semiconductor devices, memory disks, or the like, it is erroneous to suggest that the disclosure of James et al., when taken as a whole, provides a nexus for the application of any semiconductor polishing system to the distinct art of polishing memory disk substrates.

Received from < > at 7/23/03 12:47:25 PM [Eastern Daylight Time]

Even disregarding the Office Action's misinterpretation of the cited references, Huynh et al. and James et al. do not provide any suggestion or motivation to combine the references in such a way as to arrive at the present invention. Rather, these references merely recite individual elements of the claimed method. In particular, although James et al. states that the polishing fluid "optionally [comprises] a pH buffer, surfactant, chelating agent, and/or oxidizer," James et al. provides no guidance whatsoever regarding when such optional components should be used, what type of such optional components should be used, and in what amount the optional components should be used. Thus, even if one of ordinary skill in the art was motivated to use a polishing fluid containing water, abrasive particles, and a pH modifier, in a method of polishing a memory disk, there is no teaching to suggest which of the optional components to include and in what amounts.

The Office Action asserts that the ordinarily skilled artisan, given the disclosure of James et al. as a guide, would be motivated to select the polishing composition disclosed by Huynh et al., despite the fact that there is nothing in James et al. that points to such a combination (as opposed to, for example, the combination of James et al. with a different reference that discloses a very different polishing composition). The only connection between the cited references seems to be the fact that James et al. suggests the preferable use of water and a pH modifier in the polishing composition and Huynh et al. discloses a polishing composition comprising water with a pH modifier, but so do hundreds, if not thousands, of other references disclosing very different polishing compositions. Indeed, Huynh et al. is not directed to a method of polishing memory disks, but rather is directed to a method of polishing semiconductor substrates. The Office Action does not provide evidence as to why the ordinarily skilled artisan would select the polishing composition of Huynh et al. over other prior art polishing compositions that also disclose the use of water and a pH modifier and that are even directed to a method of polishing memory disks. For example, U.S. Patent 4,929,257 discloses a method of polishing a memory disk using a polishing composition comprising an abrasive, water, a pH modifier, a polishing accelerator, and a surface-modifying agent. Similarly, U.S. Patent 6,015,506 discloses a method of polishing a memory disk using a polishing composition comprising an abrasive, water, a pH modifier, an oxidizing agent, and a catalyst with multiple oxidation states. Moreover, the Office Action does not provide evidence as to why the ordinarily skilled artisan would select the polishing composition of Huynh et al. over other prior art polishing compositions that also disclose the use of water, a pH modifier, and a pH buffer as in Huynh et al. For example, U.S. Patents 5,340,370 and 5,516,346 disclose polishing compositions comprising an oxidizing agent, abrasive, a pH modifier (e.g., acetic acid), and a pH buffer (e.g., potassium acetate).

Received from < > at 7/23/03 12:47:25 PM [Eastern Daylight Time]

Similarly, U.S. Patent 5,700,383 discloses a polishing composition comprising an abrasive, a chelating agent, and a pH buffering system (e.g., citric acid and potassium citrate).

The Office Action further asserts that the ordinarily skilled artisan, given the disclosure of Huynh et al. as a guide, would be motivated to combine the polishing composition of Huynh et al. in the method of polishing a memory disk of James et al. Again, there is nothing in Huynh et al. that even remotely points to such a combination. James et al. is directed to a polishing system comprising a fixed abrasive polishing pad; however, Huynh et al. never discloses or suggests that the polishing composition could be used with a fixed abrasive polishing pad. Even given the combination of references, there is nothing in the references that would suggest that using a pH buffered polishing system is beneficial in the polishing of memory disk substrates.

Given that the disclosure of James et al. lacks any guidance regarding the type of polishing composition to be used for polishing a memory disk substrate, and given that the disclosure of Huynh et al. lacks any suggestion that the pH buffered polishing composition could be used for the polishing of memory disk substrates, one of ordinary skill in the art would not be motivated to combine the cited references, except with the improper hindsight of the present invention.

(b) There Is No Reasonable Expectation of Success

Even if the ordinarily skilled artisan were provided with the combination of James et al. and Huynh et al., they would have no reasonable expectation of success that the use of a pH buffer in a method of polishing a memory disk would be advantageous. As discussed above, neither James et al. nor Huynh et al. teaches or suggests that the use of a pH buffer in a polishing system for polishing memory disks is desirable, or even possible. Moreover, phosphates are just one of a list of possible pH buffering agents. In the absence of at least a teaching that controlling the pH is important when polishing memory disks, and a teaching that phosphates are particularly good pH buffering agents in the context of polishing memory disks, the ordinarily skilled artisan would not have had a reasonable expectation that the combination of the teachings of the cited references would result in a successful method of polishing memory disks.

(c) The Cited References Do Not Teach or Suggest All the Claim Limitations

The cited references, either alone or in combination, fail to teach or suggest all the elements of the invention as recited in the pending claims. In particular, the cited references do not disclose a method of polishing a memory disk comprising abrading the substrate with a polishing system comprising about 0.04 M or higher phosphate ion or phosphonate ion.

Received from < > at 7/23/03 12:47:25 PM [Eastern Daylight Time]

James et al. does not even mention a phosphate ion or a phosphonate ion, let alone disclose the use of 0.04 M or higher concentration phosphate ion or a phosphonate ion. Huynh et al. discloses phosphate ions among a laundry list of possible buffering agents and suggests that those buffering agents are preferably used in a concentration of 0.01 M to 0.1 M. Huynh et al. does not recognize the significance of using phosphate ions over the other possible buffering agents, the particular significance of using 0.04 M or higher phosphate ions, or the desirable effects on the polishing rate that arise from using 0.04 M or higher phosphate ions in a method of polishing a memory or rigid disk. James et al. provides no suggestion for how to modify the composition disclosed by Huynh et al. in order to arrive at the invention recited in the pending claims. Indeed, the ordinarily skilled artisan, if provided with the combination of cited references, would still face extensive experimentation, beyond the realm of "routine optimization," before the ordinarily skilled artisan could arrive at the particular components and beneficial concentration of at least the phosphate ions or phosphonate ions range discovered by the appellants and recited in the appealed claims.

For the foregoing reasons, the Patent Office has not met its burden of showing a clear and particular suggestion or motivation to combine the disclosures of the cited references in such a way as to arrive at the claimed invention. Accordingly, the Section 103(a) rejection should be reversed as to all the appealed claims.

B. Rejection of Claims 15 and 16 under Section 103(a)

The final Office Action alleges that the subject matter of claims 15 and 16 is obvious under Section 103(a) in view of Huynh et al. in combination with James et al. and Ishitobi et al. In particular, the Office Action recognizes that neither Huynh et al. nor James et al. disclose the use of 0.1 to 5 M oxidizing agent, but alleges that Ishitobi et al. teaches an abrasive composition comprising greater than 0.01 wt.% oxidizing agent for polishing a memory disk. Thus, according to the Office Action, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify the composition of Huynh et al. with the wt.% of oxidizer as taught by Ishitobi et al. to enhance the abrading action. However, Ishitobi et al. does not supply the missing teachings of Huynh et al. and James et al., which have been discussed above with respect to the rejection of claims 1-14 and 17-23. Accordingly, the Office Action has not met its burden to support the Section 103(a) rejection of claims 15 and 16, which rejection should be reversed.

Received from < > at 7/23/03 12:47:25 PM [Eastern Daylight Time]

In re Appln. of Fang et al.
Application No 09/595,227

Conclusion

In view of the above, Appellants respectfully urge that the Examiner's rejections be reversed.

Respectfully submitted,

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Date: December 20, 2002

CERTIFICATE OF MAILING

I hereby certify that this APPELLANTS' BRIEF ON APPEAL (along with any documents referred to as being attached or enclosed) is being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, Washington, D.C. 20231.

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In re Appln. of Fang et al.
Application No. 09/595,227

APPENDIX - PENDING CLAIMS ON APPEAL

1. A method for planarizing or polishing a surface of a memory disk comprising abrading at least a portion of the surface with a polishing system comprising (i) a polishing composition comprising water, an oxidizing agent, and about 0.04 M or higher phosphate ion or phosphonate ion, and (ii) abrasive material.

2. The method of claim 1, wherein the polishing composition comprises about 0.04 M or higher phosphate ion.

3. The method of claim 1, wherein the polishing composition comprises about 0.04 M or higher phosphonate ion.

4. The method of claim 1, wherein the surface of the memory disk comprises nickel-phosphorus.

5. The method of claim 1, wherein the polishing system has a pH of about 1-12.

6. The method of claim 5, wherein the polishing system has a pH of about 2-5.

7. The method of claim 1, wherein the abrasive material is abrasive particles selected from the group consisting of alumina, silica, titania, ceria, zirconia, germania, magnesia, coformed products thereof, and mixtures thereof.

8. The method of claim 7, wherein the abrasive particles are silica particles.

9. The method of claim 8, wherein the abrasive particles are condensation-polymerized silica particles.

10. The method of claim 1, wherein the abrasive material is abrasive particles present in the polishing composition in a concentration of about 0.1 wt.% or more.

11. The method of claim 1, wherein the abrasive material is fixed on or in a polishing pad.

Received from < > at 7/23/03 12:47:25 PM [Eastern Daylight Time]

12. The method of claim 1, wherein the oxidizing agent is selected from the group consisting of per-compounds, bromates, perbromates, chlorates, perchlorates, dichromates, periodates, iodates, nitrates, permanganates, sulfates, citrates, cerium (IV) compounds, oxidizing metal salts, oxidizing metal complexes, nonmetallic oxidizing acids, ferricyanides, trioxides, and salts thereof, and mixtures thereof.

13. The method of claim 12, wherein the oxidizing agent is selected from the group consisting of peroxides, persulfates, percarbonates, and salts thereof, and mixtures thereof.

14. The method of claim 12, wherein the oxidizing agent is selected from the group consisting of hydrogen peroxide, ammonium persulfate, potassium iodate, and mixtures thereof.

15. The method of claim 1, wherein the oxidizing agent is present in the polishing composition in an amount of about 0.01 wt.% or more.

16. The method of claim 15, wherein the oxidizing agent is present in the polishing composition in an amount of about 0.1 wt.% or more.

17. The method of claim 2, wherein the phosphate ion is derived from a water-soluble phosphate.

18. The method of claim 17, wherein the phosphate ion is derived from a source of phosphate ion selected from the group consisting of orthophosphates, polyphosphates, and mixtures thereof.

19. The method of claim 17, wherein the phosphate ion is derived from a source of phosphate ion selected from the group consisting of ammonium phosphate, potassium phosphate, sodium tripolyphosphate, and mixtures thereof.

20. The method of claim 3, wherein the phosphonate ion is derived from a source of phosphonate ion selected from the group consisting of amine-containing phosphonates, imine-containing phosphonates, imide-containing phosphonates, amide-containing phosphonates, phosphonate compounds containing no nitrogen, and mixtures thereof.

Received from < > at 7/23/03 12:47:25 PM [Eastern Daylight Time]

21. The method of claim 3, wherein the phosphonate ion is derived from a source of phosphonate ion selected from the group consisting of phosphoacetic acid, 2-aminoethyl dihydrogen phosphate, aminotri-(methylenephosphonic acid), nitrilotris(methylene)triphosphonic acid, 1-hydroxyethylidene-1-diphosphonic acid, and diethylenetriaminepenta-(methylenephosphonic acid), and mixtures thereof.

22. The method of claim 1, wherein the phosphate-ion or phosphonate ion is present in the polishing composition in an amount of about 0.06 M or higher.

23. The method of claim 1, wherein the phosphate-ion or phosphonate ion is present in the polishing composition in an amount of about 0.08 M or higher.

Received from < > at 7/23/03 12:47:25 PM [Eastern Daylight Time]